



A.D. 1856 N° 2619.

Preparation of Worts and Washes for Brewing and Distilling, &c.

LETTERS PATENT to Henry Dircks, of Moorgate Street, in the City of London, Engineer, for the Invention of "IMPROVEMENTS IN THE PREPARATION AND APPLICATION OF THE MATERIALS FOR MAKING WORTS AND WASHES IN BREWING, DISTILLING, AND LIKE OPERATIONS, AND IN THE APPARATUS CONNECTED WITH THE SAME."

Scaled the 6th January 1857, and dated the 7th November 1856.

PROVISIONAL SPECIFICATION left by the said Henry Dircks at the Office of the Commissioners of Patents, with his Petition, on the 7th November 1856.

I, HENRY DIRCKS, of Moorgate Street, in the City of London, Engineer, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE PREPARATION AND APPLICATION OF THE MATERIALS FOR MAKING WORTS AND WASHES IN BREWING, DISTILLING, AND LIKE OPERATIONS, AND IN THE APPARATUS CONNECTED WITH THE SAME," to be as follows:—

My said improvements consist in producing from the farinaceous materials one or more qualities of flour, and one or more qualities of pollard and bran or husk, and in applying the flour and husk so produced in brewing, distilling, and like operations, in the manner and by means of the apparatus herein-after referred to. I employ milling apparatus for the production of the different qualities of flour and husk, and treat the flour and husk separately in suitable vessels, with strainers and mixing arms or stirrers, adapted for obtaining the extract from the flour or husk. The hops may be treated in the usual manner, or the obtaining of the extract therefrom may be facilitated by apparatus for

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steaming and boiling, and may be aided by centrifugal action. The boiling may take place in coppers heated by steam or hot water, with a refrigeratory pipe for cooling the wort, and other arrangements may be employed for cooling the worts, and for bringing the same to the state of concentrated extracts, and colouring may be prepared from such extracts or the husk. The processes and arrangements herein-before referred to may be applied to amylaceous matters generally, and to obtaining wort from common brewers' grist.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Henry Dircks in the Great Seal Patent Office on the 7th May 1857.

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TO ALL TO WHOM THESE PRESENTS SHALL COME, I, HENRY DIRCKS, of Moorgate Street, in the City of London, Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Seventh day of November, in the year of our Lord One thousand eight hundred and fifty-six, in the twentieth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Henry Dircks, Her special licence that I, the said Henry Dircks, my executors, administrators, and assigns, or such others as I, the said Henry Dircks, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IMPROVEMENTS IN THE PREPARATION AND APPLICATION OF THE MATERIALS FOR MAKING WORTS AND WASHES IN BREWING, DISTILLING, AND LIKE OPERATIONS, AND IN THE APPARATUS CONNECTED WITH THE SAME**;" upon the condition (amongst others) that I, the said Henry Dircks, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Henry Dircks, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

35

Color
malt

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My said improvements, in so far as they relate to the process of preparing the farinaceous materials, consist in the application of corn or flour mills, driven by steam or other power, for grinding the malt or the unmalted grain, combined with the employment of bolting machines, or wire or other dressing machines, for dressing the malt, meal, or other meal produced thereby, delivering one or more qualities of flour and one or more qualities of pollard and bran or husk.

In carrying out my improved process of making worts and washes from the materials thus prepared, I first treat the flour, by mixing it intimately with moderately heated water, and keep the mixture at a regulated and maintained temperature in suitable pans, tanks, or other vessels until the diastase of the malt has sufficiently saccharised the malt starch and any added starch. I next operate on the bran or husk by itself, or mixed with the pollard, using hot water therewith in a mash tun or other distinct vessel and leave the mash covered up for some time to saccharify the small adhering portion of starch, and to obtain the colouring and flavouring principles of the husk.

The flour and water may either be mixed by the aid of one or more large mixing apparatus answering the purpose of a mash tun, or may be passed in successive portions through lesser apparatus, and be thereby brought to a thin batter or pasty consistence, and allowed to flow to the pans or other vessels for saccharification. The mixing apparatus may be variously constructed, having within each a rotating shaft carrying arms or stirrers, the flour falling on suitable sieves and thence into the water simultaneously agitated beneath; or a boss may slide freely on the centre shaft, carrying two, four, or more horizontal arms or brushes, which being raised to the top of the shaft and temporarily retained there, the flour may be discharged into the mash tun above a finely perforated false bottom until filled up one half or more. The flour being then gently pressed and levelled, the two or more brushes may be slid down the shaft and the shaft gently rotated to cause the brushes to level the top surface of the flour. Water at a moderate temperature being next admitted, the rotation of the shaft will carry the brushes gently over the surface of the flour, and gradually and regularly combine it with the water. The descent of the brushes may be regulated by a screw through a bracket on the shaft, or other like means. The brushes should be set inclined, and they may be made of bristles, wire, and various known materials.

The saccharifying vessels may be made of metal or wood, or a combination thereof, and be of various dimensions, forms, and construction. They may be heated by furnaces, or by steam or hot water jackets, pipes, or similar means as customarily applied for heating pans, tanks, and like vessels. They may

bran or
husk

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also have in each a centre rotating shaft carrying arms and stirrers, and contain a strainer made of suitable woven fabric, a diaphragm, false bottom, or other filtering medium placed either stationary or made moveable to detain insoluble matter, and if required assist its discharge from the vessels when emptying them; and the worts may likewise, when needful, be filtered 5 through layers of the bran or husk, charcoal, sand, or other independent strainers or filters.

Figure 1 of the Drawings hereunto annexed is a sectional elevation of one form of saccharifying pan constructed according to my said Invention.

A, A, A, is a copper pan, connected by flanges *a, a*, with a hot water or 10 steam jacket B, B; the top edge of the pan at *b, b*, is turned up to admit the outer edge of the lid or cover C, C; and *c, c*, is a ring of gasket or other packing; and *d, d*, a metal ring to equalise the pressure of a number of clamps set round the edge to make a steam-tight joint. The cover has at D an aperture, which may be connected with a jointed pipe from a steam boiler, 15 to blow in steam when required. E is an opening for a thermometer; F, a centre packed collar to receive a stirrer or insert. G, H, a turned metal rod, fitting steam-tight, connected at *e* with the bottom of I, I, I, a canvas or other strainer or filter, which rod, when raised until H is at *e¹, e¹*, will then cause the strainer also to rise and take the situation marked by the dotted 20 lines *f, f, f, f*; a solid or tubular metal hoop J, J, rests on small brackets within the top edge of the pan, and serves to clip and distend the strainer I, the top edge of which may have a cord *g* secured to it all round to prevent its slipping down between the pan and the hoop. The jacket, if of cast iron, may have a perforated boss *h, h*, cast in the bottom to receive the draw-off 25 cock K; the jacket should also have an inlet at L and outlet at L¹ for the circulation of hot water supplied from a proper boiler, and similar inlets and outlets M, M¹, for connection with a suitable steam boiler, as usual in heating by means of steam or hot water, the same being admitted to the space *i, i*, between the pan A and the jacket or casing B. I would here observe that 30 when the first liquid products are drawn off from the saccharising vessels, the remaining extract retained by soakage may be recovered by steaming or boiling in the same or like constructed vessels, but the husk readily yielding its extract retains little or nothing of value in soakage. The principle on which my saccharising vessels are constructed may be variously applied in 33 converting brewers' iron and wood tanks, cisterns, backs, mash tuns, and like vessels to serve the same purpose. Perforated steam pipes may be inserted within the layers of insoluble matter when too thickly spread to convey steam to the interior, and filtration may be facilitated by a vacuum or by steam

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pressure. As saccharisation is complete in three hours, or thereabouts, a second class of vessels may be used in which to conduct the filtering and steaming; they may be of any convenient form, but the shallower the better, divided with a horizontal diaphragm or filter, and being placed near the saccharising vessels
 5 would serve to receive the saccharised charge every three hours, or thereabouts, by which arrangement one sett of vessels might be employed to saccharise repeated charges, and the second vessels be engaged entirely in steaming the saccharised materials to exhaust the soluble portion. Steam may be obtained when requisite from a separate steam boiler, and the steam
 10 blown in either over or under the saccharised materials to be so exhausted for obtained worts or washes. Worts may thus be obtained that will require little or no concentration by boiling. The hops may be boiled in the worts as generally practised for brewing; or, by my improved process an extract may be obtained from the hops suitable for adding to worts, for which purpose
 15 I either use the hops in their natural state, or sifted, or rubbed with sugar, and subject them to boiling and steaming.

Figure 2 is a sectional elevation of one arrangement of my improved apparatus for obtaining hop extract. A¹, A¹, is the external body of a vessel of which B¹ is the bottom, with a central steam pipe C¹, C¹, fixed to it, and is
 20 open at both ends; D¹ is a cover, with a funnel E¹, and also has a rim round its outer edge, dipping into a channel F¹ to afford a water-joint; G¹ is a perforated false bottom; and H¹ is a perforated plate, merely to press on the hops placed within the space a¹, a¹. The liquid extract percolates into b¹, b¹, and is withdrawn at I¹; a flange c¹, c¹, runs round the lower edge of the
 25 vessel, so that when fitted to a pan or copper of the requisite diameter the flanges of both may be clamped together, with gasket or other packing or luting between, obliging the steam to escape up C¹ and steam the hops in a¹; or steam may be introduced in various known ways. Or, the apparatus may consist of a cylinder or concentric cylinders, having a hollow perforated shaft
 30 or like means for admitting steam, the extract being displaced by centrifugal action; and all such apparatus are also applicable for exhausting brewers' ordinary spent hops.

The boiling of worts made according to my said improved process may take place in coppers heated by steam or hot water, and may have a refrigeratory
 35 pipe for wholly or partially cooling the worts therein, and other arrangements may be employed for cooling the worts and bringing the same to the state of concentrated extract, and colouring may be prepared from such extracts, or from the husk roasted in rotatory cylinders. The processes and arrangements herein-before referred to may be applied to amylaceous matters generally, and

hops

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to obtaining worts from common brewers' grist. Worts from the flour of malt alone, or combined with other flour or starch, are desirable for wine and vinegar making; or worts so obtained may be hopped to produce pale and mild or bitter beers; and washes made in like manner, not hopped, will be suitable for distillatory purposes. 5

Having thus fully described my said Invention, I would here remark that I prefer employing the application of hot water for heating during the saccharifying process, after which the higher temperatures may be obtained by using steam. But I desire it to be understood that as the several methods employed throughout my processes may be considerably modified, I do not 10 limit myself to the precise modes herein described for conducting the same, so long as the results are substantially in accordance with the principle of my said Invention, neither do I confine myself to any particular form, dimensions, or materials in the construction of my apparatus; and I do declare that what I claim as my improvements are, namely:— 15

First, the peculiar preparation of malt and unmalted grain, by grinding and dressing, combined with the modes of treatment, for making worts or washes.

Second, the apparatus for mixing flour and water.

Third, the application of brushes in apparatus for mixing flour and 20 water.

Fourth, the construction and application of saccharifying pans or vessels for making worts and washes.

Fifth, the construction and application of vessels for steaming and filtering the saccharised materials. 25

Sixth, the preparing of concentrated extracts, either viscid or solid, freed from the colouring and bitter of the separated husk.

Seventh, the application of such pale extracts or worts deprived of husk flavour in brewing either mild or bitter pale ale.

And, eighth, the method of making hop extract for brewers' worts,—as 30

In witness whereof, I, the said Henry Dircks, have hereunto set my hand and seal, this Sixth day of May, in the year of our Lord 1857.

HENRY DIRCKS. (L.S.)

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